8.10 BIOLOGICAL RESOURCES

8.10.1 Affected Environment

Introduction/Region of Influence

Biological resources include plant and animal species and the habitats or communities in which they occur. This section is divided into discussions of general wildlife, vegetation, and habitat types common to PTA, including sensitive species and habitats known to occur or with the potential to occur in this area. Federal, state and locally regulated species are included in this report, along with rare species, identified by rapid population decline or whose habitat has markedly decreased in recent years.

The terrestrial portion of the PTA ROI (Figure 8-26) was based largely on the potential for damage from fires during training and, in the case of the military vehicle trail, damage due to the expansion of and increased activity on the trail. Fire has been evaluated to be the most far-reaching impact on PTA, with the exception of PTA Trail, because of its ability to affect a large area. Degradation of habitat due to physical activities around PTA Trail would have the greatest potential impact on the area due to the nature of activities proposed and allowed in their vicinity. The terrestrial portion of the PTA ROI also includes a 164-foot (50-meter) buffer on either side of the proposed trail, as well as a portion of the coast over which aircraft maneuvers may occur. The marine portion of the PTA ROI involves the nearshore and offshore Pacific waters between O'ahu and the island of Hawai'i, the Pearl Harbor area of O'ahu, the Kawaihae Harbor area of the island of Hawai'i, and adjacent coastlines to the harbors (see Figure 3-13). Portions of this area are within the Hawaiian Islands Humpback Whale National Marine Sanctuary waters. The location and sensitivity of these marine ecosystems were taken into account when determining the marine portion of the PTA ROI for the Proposed Action.

Biological data were collected from numerous sources, including the USFWS, NMFS, HDLNR, HBS, HINHP, US Army PTA, and various biological surveys and environmental documents that are cited throughout this document. For details on pertinent regulations see Appendix N.

Recovery Plans

Seven plant and six animal species with recovery plans are known to or have the potential to occur within the PTA ROI. These species are listed in Appendix I-1a.

Vegetation

PTA is on the island of Hawai'i, on the west side of Humu'ula Saddle, a plateau formed by Mauna Kea and Mauna Loa. The surrounding lands are mostly designated as conservation district and are managed or leased by a variety of private landowners and the State of Hawai'i. Studies of the vegetation communities in the saddle region of Hawai'i date from 1861. The next study was in 1888, and these continued through the 1930s. A 1977 EIS by Environmental Impact Survey, Inc., provided a comprehensive vegetation listing, and the floristic inventory of PTA by CEMML began in 1988 and continues today. Approximately

Figure 8-26
Pōhakuloa Training Area Terrestrial Region of Influence

38 percent of the plants found on PTA are indigenous or endemic and thousands of hours have been spent collecting information on their location and distribution. Endangered and threatened species and species of concern (all defined according to federal guidelines) are found on PTA. Vegetation communities occurring in the PTA ROI are identified in Figure 8-27 and described below.

Though PTA is the largest military training area outside of the continental US, almost one-third of the land has been deemed unsuitable for training. The impact area accounts for almost 50 percent of PTA, and no troop movement is permitted in this area. Additionally some of the terrain is inhospitable and unusable for training. Twenty-three separate training areas at PTA support a variety of military exercises. Outside of the PTA boundaries are grassy rangelands and pastures dominated by introduced vegetation (Figure 8-27). Mature native plants are rarely found in these communities disturbed by cattle though they can be found in rocky areas where cattle movement is unlikely. There is a unique vegetation community in the lower south end of the parcel, specifically *Styphelia-Ostomeles-Dubautia* shrubland, a lowland mesic shrubland community.

The Army uses the Kawaihae Military Reservation as its port facility for shipping equipment and ammunition from O‘ahu. A trail stretches from the Kawaihae Harbor to the installation, but it is seldom used. This trail is heavily weeded and described as extremely stony with a very fine sandy loam that is prone to erosion if not vegetated.

There are 24 vegetation communities on PTA (Shaw and Castillo 1997). It is important to note that numerous introduced plant species make up a significant portion of many of these habitats, and, additionally, introduced plants are components in all habitats on PTA. About 62 percent of the plants found at PTA are introduced species. Barren lava covers 25 percent of the installation. Lichens, such as *Stereocoulon vulcani,* and ferns, such as *Pella ternifolia,* are the first colonizers of these flows, though fountain grass *(Pennisetum setaceum)* is invading barren areas.

There are four types of *Metrosideros* treeland, ranging from sparse to mixed intermediate. The dominant canopy vegetation in these areas is generally ‘ōhi‘a. The mixed intermediate treeland has a second canopy layer made up of primarily *Myrsine lanaiensis* and naio (*Myoporum sandwicense).* Understory species include different densities of ‘a‘ali‘i, *Styphelia tameiameiae,* and, in some instances, *Osteomeles anthyllidifolia.* Fountain grass is invading all of these communities.

There are three types of *Dodonaea* shrubland: open, dense, and mixed. ‘A‘ali‘i *(Dodonaea viscosa)* is the dominant plant in each community, along with other native species, including ‘ilima *(Sida fallax),* ‘āheahea *(Chenopodium oahuense),* and naio. Fountain grass is invading all of these communities.

Styphelia occurs either as a mixed shrubland community or as a component of *Styphelia-Dodonaea* shrubland. No rare plants are associated with these communities, though natives like *Styphelia tameiameiae*, naio, ‘a‘ali‘i, and *Sophora chrysophylla* are common.

Figure 8-27
Vegetation Communities at the Pōhakuloa Training Area Region of Influence

Chamaesyce treeland is generally found hosting native species of *Chamaesyce olowaluana* (a species of concern), ʻilima, ʻāheahea, and ʻaʻaliʻi. *Chenopodium* shrubland and *Eragrostis aptopioides* grassland are similar communities with different dominant species. ʻĀheahea occurs sparsely as shrubs in the grassland, and *Eragrostis aptopioides* is the dominant native grass in the shrubland.

The remainder of the native natural communities is a combination of *Chamaesyce, Myoporum,* and *Sophora* species, with divisions based on the densities of species.

Kīpuka Kalawamauna Endangered Plants Habitat encompasses 7,869 acres (3,185 hectares) in the northwestern area of PTA. The endangered plants documented there are *Haplostachys haplostachya, Stenogyne angustifolia, Asplenium fragile* var. *insulare, Hedyotis coriacea, Silene lanceolata, Tetramoloipum arenarium* var. *arenarium,* and *Zanthoxylum hawaiiense*. Much of the area is fenced and allows limited vehicle access.

The Kīpuka ʻAlalā fenced unit is approximately 5,000 acres (2,023 hectares) and includes the former Multi-Purpose Range Complex in Training Area 23. Training in this area is restricted to small-scale dismounted maneuvers, but it has never been used (Gleason 2003). No SBCT training is planned for the 1,500 acres (608 hectares) containing the MPRC, though dismounted maneuver training would occur at the remaining sections Training Area 23. Rare species in this management area are *Hedyotis coriacea, Stenogyne angustifolia*, *Silene hawaiiensis*, *Zanthoxylum hawaiiense*, *Chamaesyce olowaluana*, *Hesperocnide sandwicensis*, *Tetramolopium humile* var. *sublaeve,* and *Haplostachys haplostachya.*

Other special status areas within the training area include palila critical habitat and emergency exclosures for individual or small groups of rare plants. Emergency exclosures currently protect *Hedyotis coriacea, Neraudia ovata, Portulaca sclerocarpa, Schidea hawaiiensis, Silene lanceolata, Solanum incompletum, Tetramolopium arenarium* var. *arenarium,* and *Zanthoxylun hawaiiense*.

West PTA Acquisition Area

Adjacent to the northwest corner of PTA is the 22,675-acre (9,176-hectare) WPAA. Biological surveys in spring 2002 showed five federally listed endangered plant species in this area: *Isodendrion hosake, Lipochaeta venosa, Haplostachys haplostachya, Stenogyne angustifolia,* and *Vigna o-wahuensis*. The plant communities are similar to those within PTA and include native and nonnative dominated shrublands and drainages of varying density and composition. Fountain grass is the dominant member of several grassland communities that can include a proportion of native shrubs, herbs, and trees. The highly disturbed communities are identified as *Eucalyptus* woodlots, alien forb lands, and pastureland, all of which contain native plants scattered through the area. There are no documented aquatic natural communities on PTA.

The Army seeks to preserve and stabilize the populations of federally listed plants on lands under their management. The Endangered Species Management program and the installation pest management activities combine and reduce the negative impacts of introduced species on the landscape (USARHAW and 25th ID[L] 2001a). Control of noxious weeds is required

by the State of Hawai'i Noxious Weed Rules (USDA, no date) and is supported by AR 200-5, *Pest Management* (HQDA 1999).

PTA has two federally listed noxious weeds, devil's thorn *(Emex spinosa)* and kikuyu grass *(Pennisetum clandestinum)*. Kikuyu grass is exceptional at PTA as it is used for revegetation efforts and is not invasive at high elevation dry ecosystems (Gleason 2003). Invasive and noxious weeds that are targeted for control on PTA include Fountain grass, Russian thistle *(Salsola kali),* Jerusalem cherry *(Solanum pseudocapsicum),* and balloon plant *(Asclepias physocarpa)*. Of these, Russian thistle is targeted for eradication. Other widespread weed species are controlled where they threaten native plants and communities.

Native plants are directly affected by populations of feral pigs *(Sus scrofa),* goats *(Capra hircus),* sheep *(Ovis aries),* and mouflon *(O. musimon),* which contribute to numerous ecological problems (Atlas 1998). The effects of these wild animals include trampled and grazed native plants and advanced erosion (HIHNP 1994). Browsing and otherwise destroying the native vegetation encourages alien plants to become established, severely affecting the habitat for native plants (Atlas 1998).

Rats *(Rattus rattus* and *R. exulans hawaiiensis)* also are known to eat the fruit from certain species of native plants, seriously affecting the plants' reproduction (Atlas 1998; Shaw 1997; PCSU 2001, 87). An additional concern with rats on PTA is that they could eat newly found native snail populations.

Human habitat disturbance on PTA includes disturbance by military training and construction activities. Trampling and dust associated with training activities could also adversely affect populations of rare plants and communities (Shaw 1997). Fire threat is high on PTA. Many of the native plant communities are interspersed with highly flammable introduced species. Additionally, the rugged terrain and vastness of the training area limit access for fire suppression and control. The Army has SOPs that reduce the potential for fire from training at PTA and on the lands leased from the neighboring ranch. The SOPs for the leased lands prohibit smoking and ensure vehicle traffic is confined as much as possible to roads and trails.

In 1989, PTA was the first Army location in Hawai'i to implement the LCTA component of the ITAM program (described in Chapter 2, Section 2.1.5). Through this program and the other ITAM components, PTA has developed a GIS database that includes data on landing zones, impact areas, firing points, soils, vegetation, and firebreaks, just to name a few. This information supports LCTA land use planning and decision-making and is instrumental in prioritizing potential LRAM projects. The SRA component of ITAM educates the troops and provides installation-specific guidance for maneuvers at PTA as some areas of PTA have significant restrictions on training.

Wildlife

Zoological field surveys that have been made on PTA include those by Shallenberger (1977), David (1995), and Freed (1991). More recent surveys targeting native rare invertebrates, mammals, and birds were also conducted (Gon et al. 1993; HINHP 1998; USARHAW and

25th ID[L] 2001b), as were entomology surveys of the PTA lava tubes (Garcia and Associates 2003). There have been no specific reptile surveys on PTA because there are no native terrestrial reptiles and amphibians on the Hawaiian Islands. Surveys of PTA were made by the University of Hawai'i, the Bishop Museum Hawaiian Heritage Program, and the HINHP (1994), which are cited in the following section. These natural resource surveys have been used for the resource assessments in the *Biological Inventory and Management Assessment on the PTA for USARHAW* (HINHP 1994a), as well as the more recent PTA INRMP (USARHAW and 25th ID[L] 2001b). The following section describes the general presence of invertebrate, mammal, bird, and fish species.

Invertebrates

Native and endemic invertebrates on PTA include the Hawaiian helicoverpa moth (*Helicoverpa confusa)* and the Giffards rhyncogonus weevil (*Rhyncogonus giffardi*). Snails documented at PTA are *Letachatina* spp., *Euconulus gaetanoi*, *Nesopupa subcentralis*, *Nesovitrea hawaiiensis*, *Striatura* spp., and *Vitrina tenella.* The helicarionid land snail *(Philonesia* spp.*)* and succineid land snail *(Succinea konaensis)* were also observed on PTA (HINHP 1994; R. M. Towill Corp. 1997b; USARHAW and 25th ID[L] 2001b). Surveys of PTA by HHP in 1993 detected the following nonnative snails: giant African snail *(Achatina fulica),* bradybaenid land snail *(Bradybaena similaris),* cannibal snail *(Euglandina rosea),* and the zonitid land snail *(Hawaiia minuscula)*. Three endemic caterpillar species, *Schrankia* sp., were noted during recent surveys for native invertebrates at PTA lava tubes (Ganda 2003). Humans have purposely or accidentally introduced these species to the island of Hawai'i. They now threaten the native snail species through competition for resources, predation, and the spread of disease (PCSU 1999, 155).

Amphibians

There are no native terrestrial amphibians on the Hawaiian Islands. Nonnative amphibians found on the island of Hawai'i include bullfrog *(Rana catesbeiana),* wrinkled frog *(R. rugosa),* giant toad *(Bufo marinus),* and Cuban tree frog *(Osteopilus septentrionalis)*. These species were introduced into Hawai'i from other countries and have inhabited areas where adequate aquatic habitat and surrounding vegetation exist. While these species have not been documented in PTA, they could occur in the general PTA ROI, which includes the proposed PTA Trail.

Reptiles

There are no native terrestrial reptiles on the Hawaiian Islands. Nonnative reptiles found on the island of Hawai'i include the green anole *(Anolis carolinenesis),* mourning gecko *(Lepidodactylus lugubris),* stump-toed gecko *(Gehyra mutilata),* tree gecko *(Hemiphyllodactylus typus),* Indo-Pacific gecko *(Hemidactylus garnotii),* house gecko *(H. frenatus),* metallic skink *(Lampropholis delicata),* and gold dust day gecko *(Phelsuma laticauda laticauda)*. The only known terrestrial snake occurring on the Hawaiian Islands is the island blind snake *(Ramphotyphlops braminus)*. While these species have not been documented in PTA, they could occur in the general PTA ROI, which includes the proposed PTA Trail.

Terrestrial Mammals

The Hawaiian hoary bat *(Lasiurus cinereus semotus)* could occur on PTA (USARHAW and 25th ID[L] 2001b; Cooper et al. 1996). It is the only native terrestrial mammal in the Hawaiian Islands. The following nonnative species have been documented as occurring on PTA: feral pig *(Sus scrofa scrofa),* feral goat *(Capra hircus hircus),* feral cat *(Felis catus),* feral dog *(Canis familiaris),* Norway rat *(Rattus norvegicus),* black rat *(R. rattus),* feral sheep *(Ovis aries)*, mouflon sheep *(O. musimon)*, mongoose *(Herpestes auropunctatus)*, and house mouse *(Mus musculus)*. The Polynesian rat *(Rattus exulans hawaiiensis)* may occur in the ROI. Cows *(Bos taurus)* presently graze in the Keamuku Parcel.

Birds

Endemic species fairly common to PTA are ʻapapane *(Himatone sanguines)* and Hawaiian ʻamakihi *(Hemignathus virens virens)*. Endemic species with declining populations less common to but identified on PTA are ʻiʻiwi *(Vestiaria coccinea),* ʻelepaio *(Chasiempis sandwichensis s.),* and ʻōmaʻo *(Myadestes obscurus)* (USARHAW and 25th ID[L] 2001b). Nonnative bird species known to occur on PTA include Erchel's francolin *(Francolinus erckelii),* black francolin *(F. francolinus),* California quail *(Callipepla californica),* and Japanese quail *(Coturnix japonica)*. The house finch *(Carpodacus mexianus)* and Eurasian sparrow *(Paser domesticus)* are also species that have been introduced by humans on the island of Hawaiʻi.

Fish

No natural aquatic systems occur on PTA (USARHAW and 25th ID[L] 2001b). Although Waiulaula Gulch and Makeahua Stream cross the proposed PTA Trail alignment, no fish data is available for the PTA ROI.

Marine Biological Resources

The marine portion of the PTA ROI is shown in Figure 3-13. The nearshore and offshore Pacific waters between Oʻahu and the island of Hawaiʻi, the Pearl Harbor area of Oʻahu, the Kawaihae Harbor area of the island of Hawaiʻi, and coastlines adjacent to the harbors are included in the ROI. As part of the Proposed Action, there would be a slight increase in vessel transit activity between Oʻahu and the island of Hawaiʻi. Boats would launch from Pearl Harbor with troops and equipment and would land at Kawaihae Harbor. The 25th ID(L) units would offload and transit from Kawaihae Harbor to PTA. Some of the transit areas for the vessels between the two islands are within or in close proximity to the Hawaiian Islands Humpback Whale National Marine Sanctuary waters (composed of five separate areas abutting six of the major islands). Designated sanctuary waters encompass the entire western portion of the island of Hawaiʻi and include waters just outside and surrounding Kawaihae Harbor. Designated sanctuary waters also occur outside of Oʻahu at Penguin Banks. Any adjacent coastline areas in the ROI may provide shore habitat for some marine wildlife, such as sea turtles and monk seals.

There is a coral reef area of management concern (known as a "hot spot") in the PTA ROI. Located at Kawaihae Harbor, this reef is identified as at risk both from extensive development at the commercial harbor and from recent and continued development at the small boat harbor. While the main issue is harbor construction, other causes of decline for this reef system include interruption of long-shore transport due to harbor development,

consequent siltation of Pelekane Bay, and close proximity to important cultural sites (i.e. Pu'u Kohola Heiau) that causes increased recreational use and human presence (CRAMP 2003). In addition to this reef identified as a management concern, there are other coral reefs in the coastal waters of the PTA ROI. One that is well known is Puako reef, approximately 8 to 10 miles (13 to 16 kilometers) from Kawaihae Harbor. There are no coral reef areas of management concern outside Pearl Harbor on O'ahu (CRAMP 2003).

Marine wildlife occurs in the PTA ROI in both the nearshore and offshore regions of Pacific waters. The harbor areas and adjacent coastline areas also provide habitat for marine wildlife. Kawaihae Harbor is on the leeward side of the island where waters are calmer and more protected. These waters provide good habitat for humpback mother and calf pods and for resting dolphin pods. Distribution and abundance of marine mammals and sea turtles in Pacific waters vary seasonally and spatially; that is, numbers and types of animals may vary in the nearshore versus offshore regions, as well as by the time of year (Calambokidis et al. 1997; Leatherwood et al. 1982; Mobley et al. 1999, 2000; NMFS 2000a-2000bb). Many marine mammal species occur year-round in Pacific waters. All marine mammal species are protected under the MMPA, regardless of whether they have additional protection under the ESA. Informal consultation with NOAA Fisheries has been initiated for marine mammals in the SBCT ROI. Both MMPA and ESA protected marine wildlife species that may occur in the PTA ROI either seasonally, permanently, or as transients, are listed in Table 8-19.

Whales and Dolphins in Hawaiian Waters of the PTA ROI

Non-ESA listed but MMPA-protected marine mammals found in Hawaiian waters of the PTA ROI include the following:

- Bryde's whales (*Balaenoptera edeni*);
- Minke whales (*B. acutorostrata*);
- Pygmy sperm whales *(Kogia breviceps*);
- Dwarf sperm whales (*K. simus*);
- Killer whales (*Orcinus orcina*);
- False killer whales (*Pseudorca crassidens*);
- Pygmy killer whales (*Feresa attenuate*);
- Pilot whales (*Globicephala macrorhynchus*);
- Beaked whale species (*Mesoplodon* and *Ziphius* spp.);
- Baird's beaked whale (*Berardius bairdii*);
- Melon-headed whales (*Peponocephala electra*);
- Bottlenose dolphins (*Tursiops truncatus*);
- Spinner dolphins (*Stenella longirostris*);
- Rough-toothed dolphins (*Steno bredanenis*) ;
- Risso's dolphin (*Grampus griseus*);

Table 8-19
Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
Cetaceans and Pinnipeds							
Balaenoptera acutorostrata	Minke whale	*	-	May occur in nearshore or offshore waters	Known Currently	P	Most common northwest of the main seven-island chain or on leeward side of islands. May be incidentally sighted in waters adjacent to or between O'ahu and Hawai'i.
B. Borealis	Sei Whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Rarely sighted in Hawaiian waters.
B. edeni	Bryde's whale	*	-	May occur in nearshore or offshore waters	Known Currently	P	Most common northwest of the main seven-island chain. May be incidentally sighted in waters adjacent to or between O'ahu and Hawai'i.
B. musculus	Blue whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Heard in Hawaiian waters.
B. physalus	Fin whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Heard but rarely sighted in Hawaiian waters.
Berardius bairdii	Baird's beaked whale	*	-	Most likely in deeper offshore waters	Known Currently	P	Expected to occur as transients in waters of the PTA ROI.
Delphinus Delphis	Common dolphin	*	-	Most likely in deeper offshore waters	Known Currently	U	May be incidentally sighted in waters between O'ahu and Hawai'i.
Eubalaena glacialis	Pacific right whale	E*	-	Unknown if depth is a criteria	Known currently	U	Most likely stray individuals from more northern population.
Feresa attenuate	Pygmy killer whales	*	-	May occur in nearshore or offshore waters	Known Currently	C	Known in the channels between the main islands. Has been documented off the coast of O'ahu. May occur in waters adjacent to or between O'ahu and Hawai'i.
Globicephala macrorhynchus	Short-finned pilot whale	*	-	May occur in nearshore or offshore waters	Known Currently	C	Known in the channels between the main islands. Common in nearshore or offshore areas in waters adjacent to or between O'ahu and Hawai'i.
Grampus griseus	Risso's dolphin	*	-	Most likely in deeper offshore waters	Known Currently	P	Most commonly sighted in offshore waters. May be seen in offshore areas in waters adjacent to or between O'ahu and Hawai'i.
Kogia breviceps	Pygmy sperm whale	*	-	Most likely in deeper offshore waters	Known Currently	P	Prefers deeper waters but occasionally seen in the channels between the main islands. May be seen in offshore waters between O'ahu and Hawai'i.

Table 8-19
Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI *(continued)*

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
K. simus	Dwarf sperm whale	*	-	Most likely in deeper offshore waters	Known Currently	P	Prefers deeper waters but occasionally seen in the channels between the main islands. May be seen in offshore areas in waters adjacent to or between Oʻahu and Hawaiʻi.
Monachus schauinslandi	Monk seal	E*, CH, D	-	More common in nearshore waters or hauled out on the coast.	Known currently	C	Most common northwest of the main seven-island chain. Incidental individuals known to haul out along main seven island shorelines. Anecdotal sighting on Kawaihae Beach.
Megaptera novaeangliae	Humpback whale	E*	-	May occur in nearshore or offshore waters	Known currently	C	Occurs throughout the main seven-island chain January through April. Occurs in all nearshore and offshore waters to the 100 fathom line adjacent to or between Oʻahu and Hawaiʻi.
Mesoplodon densirostris	Blainsville's whale	*	-	Most likely in deeper offshore waters	Known Currently	C**	Prefers deeper offshore waters. Has been sighted off coast of Oʻahu. May be seen in offshore areas in waters adjacent to or between O'ahu and Hawai'i.
Orcinus orca	Killer whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occasionally seen, especially in the channels between the main islands and at the northwest island chain. May be incidentally sighted in nearshore or offshore waters adjacent to or between Oʻahu and Hawaiʻi.
Peponocephala electra	Melon-headed whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occurs especially in the channels between the main islands and at the northwest island chain. May also occur in nearshore or offshore areas adjacent to or between Oʻahu and Hawaiʻi.
Physeter macrocephalus	Sperm whale	E*	-	Most likely in deeper offshore waters	Known currently	C	Most common off the north and eastern shores of the main seven islands. May be sighted in waters adjacent to or between Oʻahu and Hawaiʻi.
Pseudorca crassidens	False killer whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occasionally seen in the channels between the main islands. May be sighted in nearshore or offshore waters adjacent to or between Oʻahu and Hawaiʻi.
Stennella attenuata	Spotted dolphin	*	-	Most likely in nearshore, leeward coastal waters	Known Currently	C	Common along the coastline, especially on the leeward sides of the island. Occurs in both nearshore or offshore areas in waters adjacent to or between Oʻahu and Hawaiʻi.

Table 8-19
Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI *(continued)*

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
S. coeruleoalba	Striped dolphin	*	-	May occur in nearshore or offshore waters	Known Currently	P	More strandings sighted than live individuals. May be sighted in nearshore or offshore waters adjacent to or between O'ahu and Hawai'i.
S. longirostris	Spinner dolphin	*	-	Most likely in nearshore, leeward coastal waters	Known Currently	C	Common along the coastlines. Occurs in nearshore or offshore areas in waters adjacent to O'ahu and Hawai'i.
Steno bredanensis	Rough toothed dolphin	*	-	Most likely in deeper offshore waters	Known Currently	C**	Prefers deeper offshore waters but has been sighted off coast of O'ahu. May be sighted in waters adjacent to or between O'ahu and Hawai'i.
Tursiops truncatus	Bottlenose dolphin	*	-	May occur in nearshore or offshore waters	Known Currently	C	Common along the coastlines. Occurs in nearshore or offshore areas in waters adjacent to or between O'ahu and Hawai'i. Also common offshore in project area waters.
Ziphius cavirostris	Cuvier's beaked whale	*	-	Most likely in deeper offshore waters	Known Currently	C**	Most common of the beaked whales in project area waters. Prefers deeper offshore waters but can be common in nearshore or offshore areas in waters adjacent to or between O'ahu and Hawai'i.
Sea Turtles							
Caretta caretta	Loggerhead turtle	T	-	In project area; prefers nearshore waters	Known currently	U	Considered uncommon in PTA ROI waters
Chelonia mydas	Green turtle	T	-	In project area; prefers nearshore waters	Known currently	C	Nests annually on Hawaiian beaches; common in nearshore areas of any of the main seven islands. Most abundant sea turtle in PTA ROI waters.
Dermochelys coriacea	Leatherback turtle	E	-	In project area; prefers offshore waters	Known currently	C	Primarily occurs over deep oceanic waters; sighted equally as frequently off any of the main seven islands. This species is expected in project area waters, especially along the north shores and in offshore waters.

Table 8-19
Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI *(continued)*

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
Eretmochelys imbricata	Hawksbill turtle	E	-	In project area; prefers nearshore waters	Known currently	U	Considered uncommon; a small number nest on the Island of Hawaii
Lepidochelys olivacea	Olive ridley turtle	T	-	In project area; prefers offshore waters	Known currently	U	Infrequently seen in Hawaiian offshore waters

Sources: NMFS 2000a-bb; ONR 2000.

Status:

[1]Federal:
E = Endangered
* = Protected under MMPA
D = Depleted under the MMPA
CH = Critical habitat designated or proposed for designation
** = presence confirmed from aerial surveys but found at a distance offshore from the coastline, as discussed in Appendix I-1.

[2]State
/-/ = No Status

Likelihood of occurrence in the project site
C = Confirmed
P = Potentially may occur
U = Unlikely to occur

- Striped dolphin (Stenell*a coeruleoalba*);
- Common dolphin (*Delphinus delphis*); and
- Several species of spotted dolphins, the most common of which is *Stenella attenuata.*

The natural history of these species, as well as specific documented locations either in or near the PTA ROI (if known), are described in Appendix I-1.

Sensitive Species

A list of all sensitive vegetation and wildlife and any critical habitat found in the region, according to USFWS and DLNR records, is found in Tables 8-19 through 8-21. An assessment of the likelihood of a species occurring on PTA was made where possible, based on the habitat requirements and geographic distribution of the species, existing on-site habitat quality, and the results of biological surveys of PTA. The Army has undergone ESA Section 7 consultation with USFWS for previous Army training and actions that would affect listed species such as the palila and its federally designated critical habitat (USFWS 1978, USFWS 1983a) as well as other listed species on the premises (USFWS 1986b). Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, are in Appendix I-1 (Recovery Plans I-1a; Plants I-1b; Wildlife I-1c; Critical Habitat I-1d).

Sensitive Plant Species

The Army has funded botanical surveys on PTA since 1988, though other surveys date as far back as 1888 (USARHAW and 25th ID[L] 2001b). Approximately 38 percent of the plants found on PTA are indigenous or endemic. Endangered species, threatened species, and species of concern (all according to federal guidelines) are found on PTA, as well as a new species *(Tetramolopium consaguinium)* that could be included on the endangered species list as it is known only from three small populations on PTA. State and locally regulated rare species are included in this report, along with species that have experienced rapid population decline or whose habitat has markedly decreased in recent years. Table 8-20 lists sensitive plant species and their potential to occur in the PTA ROI. Documented occurrences of sensitive plant species in the PTA ROI are shown in Figure 8-28.

Sensitive Wildlife Species

The following discussion includes a profile of only those sensitive wildlife species considered likely to be found in the project area. This information is based primarily on information from the PTA INRMP (USARHAW and 25th ID[L] 2001b, R. M. Towill Corp. 1997c); special species wildlife information was based on surveys conducted on PTA. In 1990 Dr. Freed conducted bird and mammal surveys at PTA (Freed 1991). Later surveys include David's two endangered and threatened species surveys conducted along designated palila critical habitat (David 1995), Cooper's studies of endangered seabirds and Hawaiian hoary bat (Cooper et al. 1996), and the HINHP's arthropod inventory (USGS 2001b). Annual avian surveys, with a focus on sensitive species, have been conducted on PTA since 1997 (HINHP 1998; Schnell et al. 1998; Schnell et al. 1999). The latest USFWS and survey information on species and habitat in the SBCT ROI has been incorporated into this evaluation of biological resources.

Table 8-20
Sensitive Plant Species Occurring on or Potentially Occurring at PTA ROI

Scientific Name	Hawaiian Name/Common Name	Federal Status[1]	State[2]/Global Status[3]	Habitat	Date Last Surveyed	Likelihood of Occurrence
Asplenium fragile var. *insulare*	-/fragile fern, lola	E, CH	-/-	Dry forest, subalpine shrubland, barren lava, and lava tubes	1999	C
Chamaesyce olowaluana	ʻakoko, kōkōmālei/ Maui milk tree	SOC	-/G2	Multiple tree and shrubland types on PTA	1999	C
Cystopteris douglasii	-/-	SOC	-/G2	Myoporum forest and shrubland	1999	C
Dubautia arborea	naʻenaʻe/-	SOC	-/-	Subalpine shrub and woodlands and alpine desert	1999	C
Eragrostis deflexa	Kalamalo/bent lovegrass	SOC	-/G1	Multiple treeland and shrubland habitats on PTA	1999	C
Exocarpos gaudichaudii	heau/whisk broom sandalwood	SOC	-/G1	Multiple treeland communities associated with *Metrosideros*	1999	C
Festuca hawaiiensis	-/Hawaiian fescue	C	-/-G1	Multiple treeland and shrubland habitats on PTA	1999	C
Haplostachys haplostachya	honohono/Hawaiian mint	E	-/G1	Multiple treeland and shrubland habitats on PTA, though with very small populations	2002	C
Hedyotis coriacea	Kioʻele/-	E, CH	-/G1	*Metrosideros* treeland communities	1999	C
Hesperocnide sandwicensis	-/-	C	-/G1	All native vegetation communities at PTA	1999	C
Isodendrion hosakae	aupauka/-	E	-/-	Several dry shrubland habitats	2002	C
Lipochaeta venosa	nehe/-	E	-/-	Dry shrubland	1999	C
Melicope hawaiensis	manena/-	SOC	-/G2	*Metrosideros* treeland and *Dodonaea* shrubland	1999	P
Neraudia ovata	maʻaloa, maʻoloa/ spotted nettle brush	E, CH	-/G1	*Metrosideros* treeland and *Myoporum* shrubland communities	1999	C
Portulaca sclerocarpa	ʻihi, poe/hard fruit purslane	E, CH	-/G1	Barren lava and *Metrosideros* treeland communities	1999	C
P. villosa	-/-	-	-/G1	*Metrosideros* treeland communities	1999	P
Schiedea hawaiiensis	maʻoliʻoli/-	SOC	-/-	Subalpine dry forests	1999	C
Silene hawaiiensis	-/Hawaiian catchfly	T, CH	-/G1	Multiple tree, shrub, and grasslands and on barren lava	2002	C
S. lanceolata	-/lanceleaf catchfly	E, CH	-/G1	Multiple tree, shrub, and grasslands and in dry habitats	1999	C

Table 8-20
Sensitive Plant Species Occurring on or Potentially Occurring at PTA ROI *(continued)*

Scientific Name	Hawaiian Name/Common Name	Federal Status[1]	State[2]/Global Status[3]	Habitat	Date Last Observed	Likelihood of Occurrence
Solanum incompletum	pōpolo kū mai/-	E, CH	-/GH	Sparse *Metrosideros* treelands and *Myoporum* shrublands	1997	C
Spermolepis hawaiiensis	-/Hawaiian parsley	E, CH	-/G1	Multiple tree, shrub, and grasslands and in dry habitats	1999	C
Stenogyne angustifolia	Ma'ohi'ohi/creeping mint	E	-/G1	Multiple tree and shrublands and on barren lava	2002	C
Tetramolopium arenarium var. *arenarium*	-/Mauna Kea pāmakani	E, CH	-/G1	*Dodonaea* mixed shrubland	1999	C
T. consaguinium ssp. *leptophyllum* var. *leptophyllum*	-/narrow leaf pāmakani	SOC	-/G1	Multiple tree and shrubland communities	1999	C
Vigna o-wahuensis	mohihihi/-	E	-/-	Lowland shrublands, dry to moist	2002	C
Zanthoxylum hawaiiense	hea'e, a'e/Hawaiian yellow wood	E, CH	-/G1	*Metrosideros* dominates dry and moist forests and on barren lava	2002	C

Sources: USFWS 2002b; USARHAW and 25th ID[L] 2001b; HINHP 2002; Shaw 1997

Status:

[1]Federal:
E = Endangered
T = Threatened
SOC = Species of concern
C = Candidate species for listing
CH = Critical habitat designated or proposed for designation

[3]Heritage Global Rank:

G1 = Species critically imperiled globally (typically 1-5 current occurrences)
G2 = Species imperiled globally (typically 6-10 current occurrences)
GH = Species known only from historical occurrences
/-/ = No Status

[2]State
/-/ = No Status

Likelihood of occurrence on the project site
C = Confirmed
P = Potentially may occur
U = Unlikely to occur

Figure 8-28
Sensitive Plant Species in the Pōhakuloa Training Area Region of Influence

Nineteen sensitive species have been determined to have the potential to occur within the PTA ROI (USARHAW and 25th ID[L] 2001b). Information regarding the locations of sensitive species on PTA is based on previous analyses of PTA natural resources (USARHAW and 25th ID[L] 2001b; R. M. Towill Corp. 1997c; HINHP 2002). The majority of these species observations have been on the west and northwest of PTA where the BSAs are located. Little information is known as to species occurrences within the impact area because zoological surveys have not been conducted due to safety hazards. Table 8-21 lists sensitive terrestrial wildlife and their potential for occurring on the island of Hawai'i and Figure 8-29 shows the locations of sensitive terrestrial wildlife documented on the PTA ROI.

Marine Wildlife

Six species of endangered whales occur in the Pacific tropical waters of Hawai'i and could potentially be found in the waters of the PTA ROI. Five of these are baleen whales including the humpback *(Megaptera novaeangliae),* fin *(Balaenoptera physalus),* blue *(Balaenoptera musculus),* sei *(Balaenoptera borealis),* and pacific right *(Eubalaena glacialis)*; and there is one toothed whale – the sperm whale (*Physeter macrocephalus*). There is one Federally listed endangered seal, the monk seal (*Monachus schauinslandi*). The monk seal has critical habitat in the northwestern portion of the Hawaiian Island chain, outside of the PTA ROI. There are five listed sea turtles that could occur in the Pacific tropical waters of Hawai'i. The two species common and confirmed in the waters of the PTA ROI are the green sea turtle *(Chelonia mydas),* which is federally listed as threatened, and the leatherback sea turtle *(Dermochelvs coriacea),* which is federally listed as endangered. The green sea turtle is expected to be the most common near the coastlines, while the leatherback would more likely be in the offshore waters along the transit lines for the vessels traveling between Oahu and the island of Hawaii.

Of these ESA-listed marine mammals, the most likely occurrences in the ROI would be for the humpback whale, the sperm whale, the monk seal, and both the green and leatherback sea turtle. Table 8-19 lists the likelihood of occurrence of these species within the project area and associated habitat and regulatory information. The natural history of these species, as well as specific documented locations either in or near the PTA ROI (if known), is described in Appendix I-1.

Sensitive Habitats

Critical Habitat

There are presently four noncontiguous specially managed vegetation areas on PTA. These areas were designated as such because of their botanical composition or rare species potential habitat. Areas additional to these are fenced units protecting individuals or populations of rare plants.

USFWS released a draft proposal for plant critical habitat for the island of Hawai'i in May of 2002 (Figure 8-30). It includes land at PTA. Over 60 percent of the total proposed area is state or privately owned. Nearly all of the lands proposed for critical habitat are unsuitable for development or other activities because of rugged terrain and lack of access. Critical habitat designation ensures that any USFWS authorized action on that land is not likely to

Table 8-21
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at PTA ROI

Scientific Name	Hawaiian Name/ Common Name	Federal Status[1]	State[2]/Global Status[3]	Habitat	Date Last Observed	Likelihood of Occurrence
Invertebrates						
Euconulus (Nesoconulus) sp.cf. *gaetanoi*	-/snail	SOC	-/-	Not available	1998	C
Helicoverpa confusa	-/Hawaiian helicoverpa moth	SOC	-/G1	Not available	1998	C
Leptachatina spp. (5 species)	-/snail	SOC	-/G1	Not available	1998	C
L. lepida	-/Amastrid land snail	SOC	-/-	Not available	1998	C
Nesopupa (Infranesopupa) subcentralis	-/snail	SOC	-/-	Not available	1998	C
Nesovitrea hawaiiensis	-/snail	SOC	-/-	Not available	1998	C
Philonesia sp.	-/snail	SOC	-/-	Not available	1998	C
Rhyncogonus giffardi	-/Giffard's rhyncogonus weevil	SOC	-/G1	Includes montane dry shrublands, dry to mesic forest and woodland	1998	C
Striatura (Pesudohyalina) sp. cf. *Meniscus*	-/snail	SOC	-/-	Not available	1998	C
Striatura sp.	-/snail	SOC	-/-	Not available	1998	C
Succinea konaensis	-/snail	SOC	-/-	Not available	1998	C
Vitrina tenella	-/snail	SOC	-/-	Not available	1998	C
Birds						
Branta sandvicensis	nēnē/Hawaiian goose	E	E/G1	Cropland, pasture, herbaceous rangeland, shrub brush rangeland, mixed rangeland, evergreen forest land, nonforested wetland, bare exposed rock and mixed barren land	1999	C
Buteo solitarius	ʻio/Hawaiian hawk	E	E/G1	Cropland, hedgegrow, hardwood forest, herbaceous grassland and hardwood woodland	1997?	P
Chasiempis sandwichensis sandwichensis	ʻelepaio/-	*	-/G4	Native Hawaiian forest, hardwood woodland and forest, nonnative forest, riparian	2000	C
Hemignathus munroi	ʻakiapōlāʻau/-	E	E/G1	Mesic to wet ʻōhiʻa, koa-ʻōhiʻa, and koa-māmane forests, dry māmane and māmane-naio forests; most common in mesic koa forests and woodlands	1997?	C
H. virens virens	amakihi/-	+	-/G3	Humid ʻōhiʻa forest, drier mamane-naio forest, subalpine scrub; at higher elevations and also in lowland mixed native-exotic forest	2000	C
Himatone sanguinea	ʻapanane/-	+	-/G4	Hardwood forest, native and mixed native/nonnative forests in higher elevations	2000	C
Loxoiides bailleui	palila/-	E	E /G1	Māmane and māmane/naio forests	2000	C

Table 8-21
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at PTA ROI *(continued)*

Species *(Scientific Name)*	Hawaiian Name/ Common Name	Federal Status[1]	State[2]/Global Status[3]	Habitat	Date Last Observed	Likelihood of Occurrence
Myadestes obscurus	ʻōmaʻo/-	+	-/G4	Primarily inhabits mesic and wet native ʻōhiʻa and mixed ʻōhiʻa and koa forests above 1000 meters elevation; also found in mixed tree fern ʻōhiʻa habitat in Hawaiʻi Volcanoes National Park, ʻōhiʻa scrub on lava flows, kipukas, and treeless alpine scrub	Unknown?	P
Pterodromoa phaeopygia sandwichensis	ʻuaʻu/Hawaiian dark-rumped petrel	E	E/G1	Open ocean; breeds along barren mountain slopes	1996?	P
Vestiaria coccinea	ʻiʻiwi/Hawaiian honeycreeper	+	-/G4	Native forests especially ʻōhiʻa *(Metrosideros)* forest	1999?	P
Mammals						
Lasiurus cinereus semotus	-/Hawaiian hoary bat	E	E/G5T2	Bare rock, cliff, hardwood forest, grassland/herbaceous, hardwood woodland, and riparian habitats	1996	C

Sources: USARHAW and 25th ID[L] 2001b; HDLNR 2002a; R. M. Towill Corp. 1997b; USGS 2001b; NatureServe 2001; Virginia Tech 1998

Notes:
*The state endangered listing refers only to the populations on Oʻahu, Lanai, and Molokaʻi.

Status:

[1]Federal:
E = Endangered
SOC = Species of concern
+ = Birds of Conservation Concern

[3]Heritage Global Rank:
G1 = Species critically imperiled globally (typically 1-5 current occurrences)
G3 = Species with restricted range, rare globally (typically 20-100 current occurrences)
G4 = Species apparently globally secure
G5 = Species demonstrably globally secure
T1 = Subspecies critically imperiled globally (typically 1-5 current occurrences)
T2 = Subspecies imperiled globally (typically 6-10 occurrences)

[2]State
E = Listed as endangered
/-/ = No Status

Likelihood of occurrence on the project site
C = Confirmed
P = Potentially may occur
U = Unlikely to occur

Figure 8-29
Sensitive Wildlife Species in the Pōhakuloa Training Area Region of Influence

Figure 8-30
Proposed Plant Critical Habitat in the Pōhakuloa Training Area Region of Influence

result in destruction or adverse modification of that habitat. Of the 58 plant species with proposed critical habitat on the island of Hawai'i, ten are located within PTA.

Palila critical habitat was first designated in 1977 when the USFWS dedicated 109,000 acres (44,111 hectares) for their protection (USFWS 1977a and 1977b). Over 4,000 acres (1,619 hectares) of this habitat are in two noncontiguous areas on PTA (Figure 8-31). The vegetation of critical habitat area A, adjacent to the BAAF, is mostly *Dodonaea* shrubland, with *Eragrosits atropoides,* māmane *(Sophora chrysophylla),* and naio *(Myoporium sandwicense).* There are no firing points in this area. Critical habitat area B is mainly māmane and naio open forest, *sophora myoporum* shrubland with grass understory, and contains 11 firing points (USARHAW and 25th ID[L] 2001b). Species with federally proposed critical habitat found at this ROI is identified in Appendix I-1d.

Biologically Significant Areas

The Hawai'i Natural Heritage Program has defined three types of BSAs for managing important natural communities (Figure 8-32). Areas outside of PTA proper but within the ROI, such as PTA Trail and Kawaihae Harbor, have not been evaluated for BSA status.

BSA1 contains a high density of federally listed endangered, proposed endangered, or candidate species; approximately 11,618 acres (4,702 hectares) within PTA proper is designated as BSA1. This includes a portion of Kipuka Kalamauna endangered plants habitat and Pu'u Kapele, which is the site of a large population of *Haplostachys haplostachya* (USARHAW and 25th ID[L] 2001b).

BSA2 contains all or some of the following: lower densities of current occurrences of federally listed endangered or proposed endangered species, current occurrences of candidate species or other species of concern that are expected to be upgraded to federally protected status within the next few years, and areas judged likely to contain high densities of federally listed species based on habitat assessment, despite the lack of any record of such occurrence to date. Approximately 20,909 acres (8,462 hectares) of BSA2 are identified in PTA proper.

BSA3 is stands of intact native vegetation, with few known occurrences of rare elements. These areas are valuable for their remnant natural vegetation and the potential to support reintroduced special status species. BSA3 areas make up a large portion of PTA, including a large portion of central and southern PTA. There are 45,841 acres (18,551 hectares) of BSA3 occurring within PTA proper.

8.10.2 Environmental Consequences

Summary of Impacts

Biological resources that have been considered include vegetation communities, wildlife, sensitive species, and sensitive habitats. All biological resources have been assessed for potential impacts from project activities. Significant impacts mitigable to less than significant have been identified for the following:

- Sensitive species and habitat from training activities;

Figure 8-31
Palila Critical Habitat in the Pōhakuloa Training Area Region of Influence

Figure 8-32
Biologically Significant Areas in the Pōhakuloa Training Area Region of Influence

- Federally listed species or habitat from training activities and construction;
- Sensitive species from the spread of nonnative species from construction and troop movements; and
- Loss and degradation of sensitive species and habitat from construction and training activities.

Less than significant impacts have been identified for migratory birds from the FTI construction, from noise and visual effects from construction and other project activities on wildlife, from vessel transport on marine wildlife, from runoff impacts on marine wildlife and coral ecosystems, and from general impacts on vegetation and wildlife from construction and training, including UAV use.

For a full description of the impact methodology used to determine impact on a resource please refer to chapter 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of significant and less than significant impacts is provided in Table 8-22. The impacts from the Proposed Action are either significant and mitigable or less than significant.

Proposed Action (Preferred Alternative)

Implementing the Proposed Action would increase the amount of land used for training ranges and maneuver lands, which would directly and indirectly impact biological resources.

Significant Impacts Mitigable to Less than Significant

Impact 1: Impacts from fire on sensitive species and habitat. Wildfire is a great threat to flora and fauna communities at PTA. An increase in construction and training at PTA would increase the likelihood of wildfires, which can spread rapidly and affect areas outside of the initial ignition area.

The use of various types of ammunition, weapon systems, and pyrotechnics during military training increases the risk of wildfire ignition. Proposed actions that could ignite fires include the use of BAX and the AALFTR. Fire sources associated with the proposed SBCT actions are discussed in detail in Chapter 8, Section 8.12, under fire hazards.

Federally listed species are known to occur within the immediate areas of the proposed ranges and in various areas throughout PTA and the WPAA (see Tables 8-20 and 8-21). Vegetation communities of PTA generally consist of montane dry forest and shrubland and subalpine dry forest and shrubland, all dominated by native species, while the WPAA is dominated by nonnative grasses and shrubs. BSAs that occur within the ROI and that would be affected by fire are presented in Figure 8-32. Species that occur within the surface danger zones of the proposed ranges could be affected by munitions during the operation of the proposed ranges. In addition to vegetation loss, major adverse ecological effects of wildland fires include reduced watershed stability, soil erosion, increased risk of weed invasion, and

Table 8-22
Summary of Potential Biological Impacts at PTA

Impact Issues	Proposed Action	Reduced Land Acquisition	No Action
Impacts from fire on sensitive species and habitat.	⊘*	⊘*	⊘
Impacts on federally listed species and their federally designated or proposed critical habitat.	⊘*	⊘*	⊘
Impact on sensitive species resulting from the spread of nonnative species.	⊘	⊘	⊘
Loss and degradation of sensitive species and habitat.	⊘	⊘	⊘
Vessel impacts on marine wildlife and habitat.	⊙	⊙	⊙
Runoff impacts on marine wildlife and coral ecosystems.	⊙	⊙	⊙
Threat to migratory birds.	⊙	⊙	⊙
Noise and visual impacts.	⊙	⊙	⊙
Impacts on general vegetation and wildlife	⊙	⊙	○

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.
* Impacts may be mitigable to less than significant.

LEGEND:

⊗ = Significant
⊘ = Significant but mitigable to less than significant
⊙ = Less than significant
○ = No impact
\+ = Beneficial impact
N/A = Not applicable

loss of native habitat. Increased fire frequency would affect the structure, composition, and function of ecosystems. The spread of alien species that results from wildfires is considered a significant impact because alien species often out-compete native species and destroy native communities, as addressed in Impact 3. Impacts from fire on sensitive species including federally listed species may be mitigable to less than significant.

Regulatory and Administrative Mitigation 1. The following measures would minimize the impact of fire on sensitive species and habitats:

- Final development and implementation of the WFMP, to be completed in August 2003. The WFMP would detail fire avoidance systems and response strategy. General fire protection measures are described in Chapter 8, Section 8.12.2, Wildfire;
- The ecosystem management directives and Army stewardship, described in Chapter 2, Section 2.2.4, would minimize fire impacts on sensitive species by protecting and restoring sensitive species and habitat;

- USARHAW is considering implementing an environmental management system to further improve the identification and reduction of environmental risks inherent in mission activities. This would include ecosystem level management for all rare species, pest management, land rehabilitation and maintenance, and fire prevention and suppression.
- ESA Section 7 Consultation and Regulatory and Administrative Mitigations 2, 3, and 4 would apply to this impact and would help reduce it to a less than significant level.
- USARHAW would notify the USFWS if a fire were to escape the firebreak roads within the ROI and would consult with the USFWS, as necessary.

Additional Mitigation 1. Potential mitigation measures for this impact include:

- Allowing grazing on the Keamuku Parcel when it is not in use for training to keep the fuel load of the alien grasses below a dangerous level.
- Providing resources to help adjacent private landowners and organizations manage their properties to minimize potential impacts of fire or other threats that may result from USARHAW activities or that may originate on private property and affect USARHAW activities.
- Replanting any area damaged by fires with plants similar to those destroyed. Native species would be used in areas where their establishment seems likely. Plants known to be invasive or noxious would not be used.

Additional Mitigations for Impacts 3 and 4 would apply to this impact and would help reduce the impact to a less than significant level.

Impact 2: Impacts on federally listed species and their federally designated or proposed critical habitat. The Proposed Action would result in short- and long-term impacts on listed species and their designated or proposed critical habitat within the ROI as a result of construction and increases and changes to training. Listed species affected by the Proposed Action include the following species:

- Plants: *Asplenium fragile* var. *insulare, Festuca hawaiiensis*, *Haplostachys haplostachya*, *Hedyotis coriacea, Hesperocnide sandwicensis*, *Isodendrion hosakae*, *Lipochaeta venosa*, *Neraudia ovata*, *Portulaca sclerocarpa*, *Silene hawaiiensis*, *S. lanceolata*, *Solanum incompletum*, *Spermolepis hawaiiensis, Stenogyne angustifolia*, *Tetramolopium arenarium* var. *arenarium*, *T. consaguinium* ssp. *leptophyllum* var. *leptophyllum*, *Vigna o-wahuensis,* and *Zanthoxylum hawaiiense.*
- Wildlife: *Branta sandvicensis, Buteo solitarius, Hemignathus munroi,* and the palila *(Loxoiides bailleui).*

Within the ROI are 15 federally listed plant species with proposed critical habitat and one wildlife species, the palila, with designated critical habitat. Proposed activities border on the palila designated critical habitat and proposed plant critical habitat (Figures 8-30 and 8-31) in the ROI. There are 12,857 acres (5,203 hectares) of the palila critical habitat and 53,701 acres

(21,732 hectares) of proposed plant critical habitat that overlap with the ROI. The Army is responsible for maintaining this habitat in a condition suitable for the palila or other listed species and, by doing so, contribute to the recovery of the species.

Construction activity and increased training in the vicinity would have adverse impacts on the habitat, deterring the recovery of the species. Populations of *Silene hawaiiensis* are known from the footprints of the BAX and AALFTR, and up to 20 percent of the total number of existing plants of this species could be adversely affected by construction. One individual representing less than one percent of the total population of *Zanthoxylum hawaiiense* occurs in the BAX project area and would likely be affected by construction. Construction activities would also increase the spread of alien species (Impact 3).

There would be a limited short-term impact on critical habitat from construction of the FTI, the Range Maintenance Facility, and the BAAF runway upgrade/extension. Construction-related dust, noise, the spread of nonnative species (discussed in Impact 3), and increased fire hazard would adversely impact palila federally designated critical habitat and the proposed plant critical habitat. Long-term impacts on listed species and their critical habitat include habitat degradation and reduction from increased human activity, spread of nonnative and invasive nonnative species due to habitat disturbance, and the higher risk of people bringing nonnative and invasive species to the area on their clothing or vehicles. The habitat degradation caused by vegetation trampling, erosion, and an increase in the visual presence of soldiers in and around the critical habitat would damage plant habitat and deter wildlife use of the area. Increased use of areas in and around palila critical habitat would result in soil erosion (discussed in detail in Impact 5). Noise would also increase as a result of elevated training, vehicle use, and the alteration of the BAAF to allow more flights. Stryker maneuvers in these areas are likely to adversely affect populations of *Stenogyne angustifolia* and *Vigna o-wahuensis*. Known populations of *Haplostachys haplostachya* exist in the WPAA, and up to 88 percent could be destroyed by off-road vehicle maneuvers in this area. The *Haplostachys haplostachya* individuals found in the ROI presently account for between 2 percent and 6 percent of their entire population.

Changes to dismounted training would include activities in TA 23, while avoiding the 1,500 acres (607 hectares) around the MPRC. Troops would be transported to TA 23 by either Strykers or trucks using existing roads. Soldiers would begin dismounted training in tactical formations by walking in dispersed groups overland, toward a given objective. During simulated engagement some soldiers may use ammunition consisting of blanks and laser weapons and seek concealment or cover during nonlive-fire training. Soldiers could trample listed plant species identified in the area, including *Silene hawaiiensis* and *Haplostachys haplostachya* (Figure 8-28), and could disturb proposed critical habitat (Figure 8-30). Listed wildlife, such as the nene, have been recorded in the proximity of TA 23 (Figure 8-29) and would be disturbed by noise of approaching Strykers, nonlive fire, and the increase in human presence in the area.

Training restrictions on palila critical habitat, established based on ESA Section 7 consultation that occurred after the designation of critical habitat in 1977 (USARHAW and 25th ID[L] 2001b), would continue to apply to activities under the Proposed Action.

Additional potential impacts such as the effects of increased noise in this area will be investigated along with the effects on palila as a part of the ESA Section 7 consultation. The increased likelihood of training-related fires and the increase in extent and intensity of such a fire is also a threat to this species and is discussed in detail in Impact 4. No off-road mounted maneuvers would be allowed in the critical habitat.

If unmitigated, the Proposed Action would adversely affect the value of federally designated and proposed critical habitat and hinder the recovery of listed species. Impacts on these federally listed species and critical habitat may be mitigable to less than significant.

Regulatory and Administrative Mitigation 2. The effects of SBCT actions on listed species and federally designated critical habitat in the ROI are being evaluated as part of ESA Section 7 consultation with the USFWS. The USARHAW would consult about the proposed plant-critical habitat when it receives its federal designation. USARHAW would carry out all reasonable and prudent measures determined during this consultation, which would help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the Proposed Action.

Additional Mitigation 2. No additional mitigation has been identified.

Impact 3: Impact on sensitive species resulting from the spread of nonnative species. The Proposed Action would lead to an increase in nonnative species for the short and long term in the PTA ROI. In general, nonnative species (both plant and animal) pose a threat to Hawaiian native ecosystems (Atlas 1998).

Introduction or spread of existing or new aggressive alien plant species can alter native plant habitat and create competition with native and sensitive plants for space, nutrients, and light (Atlas 1998). Invasive plants have an advantage in becoming established in an environment that is stressed and can often out-compete native species that are not adapted to the novel environment created through human activity (Wagner et. al. 1999). Alien species often benefit from fires, due to their ability to colonize areas following a burn. In addition, nonnative plant species are frequently more flammable than native plant species, so that fires are more likely to occur and affect the populations to a larger extent. Although most plant species in and around the proposed PTA Trail and the WPAA are nonnative, there is the possibility that the area could be further disturbed, by increasing the fire hazard for surrounding sensitive areas and species. This impact would affect the 25 sensitive plant species and 23 sensitive wildlife species (tables 8-20, 8-21) that are likely to occur within the PTA ROI.

Movement of troops and equipment into Hawai'i from continental US or foreign ports, as well as from other islands or subinstallations within Hawai'i would increase the likelihood of alien plant introductions. Construction workers and equipment used to build the PTA Trail, the construction at BAAF, and range ground softening would introduce and spread nonnative species. The BAAF runway upgrade and expansion also risk introducing animal species because the airplanes are more likely to bring in alien species by transporting cargo, stored goods, and additional soldiers.

Implementation of the Proposed Action would increase the number of vehicles traversing PTA Trail, including both Strykers and conventional vehicles. There would be 145 trucks and HMMWVs and 96 Strykers that would travel from Kawaihai Harbor to PTA twice a year. This would be an increase in 105 trucks per event from existing Legacy Force use patterns and a 100 percent increase in Stryker use. Ninety percent of the Strykers and sixty percent of the trucks would travel along the PTA Trail. Strykers have a more intense impact on the land than do conventional military vehicles already in use (discussed in Impact 5). The more intense impact on the land would increase the potential for the spread and establishment of nonnative and invasive plant species. Dismounted training in Training Area 23 would likely introduce and spread nonnative species in this high habitat value area that supports many sensitive species. The Proposed Action would also increase the likelihood of a fire in the ROI, as detailed in Impact 1.

Nonnative wildlife species are an existing problem in the ROI that would not change as a result of implementing the Proposed Action. The prolonged prohibition of hunting in certain areas due to the presence of unexploded ordnance could be a factor in the proliferation of nonnative mammals at PTA.

Regulatory and Administrative Mitigation 3. USARHAW would follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines federal agency duties in regard to preventing and compensating for invasive species impacts. USARHAW would agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT actions to minimize the risk of harm. Implementing an environmental management system would further improve the identification and reduction of environmental risks inherent in mission activities.

ESA Section 7 Consultation and other regulatory and administrative measures identified in Mitigations 1, 2, and 4 would apply to this impact and would help reduce the impact to a less than significant level.

Additional Mitigation 3. Potential mitigation measures for this impact include:

- Educating soldiers and other potential users of the facilities and roads in the importance of cleaning vehicles and field gear. Contractors and their employees would be educated about the need to wear clean clothes and to maintain clean vehicles when coming onto the construction site and would comply with measures to avoid introducing alien species to the project site.
- Using native plants in any new landscaping or planting efforts, where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.
- Requiring all construction vehicles and equipment, excluding privately owned vehicles, to undergo a mandatory wash prior to entering construction sites. The construction vehicles and equipment would be left at the construction site or would be rewashed before returning to the construction site.

- Inspecting and washing all military vehicles at wash rack facilities prior to leaving SBMR, KTA, or PTA to minimize spreading weeds, such as fountain grass, and relocating invertebrates.
- Building a vehicle wash facility at Kawaihae Harbor so that any Army vehicle transported from another island/training area would undergo a mandatory vehicle wash and inspection before traveling to or from PTA. Implementing this mitigation would depend on the utility requirements and space restrictions at Kawaihae Harbor.

Additional mitigations 1, 2, and 4 would apply to this impact and would help reduce the impact to a less than significant level.

Impact 4: Loss and degradation of sensitive species and habitat. Construction and training projects would have short- and long-term impacts on sensitive habitat and species occurring with the PTA ROI.

A moderate to large portion of vegetation within the construction footprints (approximately 10 to 30 percent) would be affected during construction of the proposed ranges. Native mammals and birds capable of escaping the area would be expected to vacate during construction. Smaller, less mobile creatures, such as small mammals (nonnative) and invertebrates, could be killed during or as a result of construction of the proposed projects. Table 8-23 indicates the area of disturbance during construction of proposed ranges. This represents a significant impact on native vegetation communities. Listed plant and wildlife are known to the PTA ROI and would be affected by the loss and degradation of the PTA ROI (Tables 8-20 and 8-21). Lava tubes have been surveyed for arthropods. However, these surveys are incomplete and therefore inconclusive. A more detailed survey will be conducted prior to construction to determine presence and extent of the root dependent arthropods.

Short-term impacts include an increase in erosion and airborne dust from the movement of heavy machinery. Soil would adversely affect plants' photosynthesis and deter wildlife. The impact of dust on longevity, reproduction, and photosynthesis is unstudied but is temporary due to the mobile state of dust and is unlikely to have significant impact on the survival or propagation of either plants or animals (Fryrear and Downes 1975). Grading, which would involve turning up the ground, moving topsoil and vegetation, and staging the heavy machinery area, would cause intensive short-term disturbance to vegetation.

Long-term loss and degradation include the loss of open space areas in and around the areas proposed for project construction and in the WPAA where extensive off-road dismounted maneuver is proposed. A direct loss of habitat would be associated with the construction of PTA Trail. Sections of PTA trail would cross biologically sensitive areas with stands of intact, relatively common native vegetation types. Part of the reason that these communities still exist is their remote location. Opening this area up to the more direct effects of humans threatens these communities and their diversity. Hawaiian plant communities evolved without the environmental pressures that are prevalent on major landmasses and thus have no defense mechanisms to cope with these stresses. Fragmenting these sensitive

communities interrupts corridors for species to naturally disperse, encourages the spread of alien plants, and limits the potential for alien species-dominated areas to be reclaimed to reintroduce native species.

Table 8-23
Construction Impacts on Vegetation of Proposed Ranges

Proposed Range	Area of Construction Impact (approximate acres)	Existing Vegetation Communities (not including the surface danger zone)
Battle Area Complex	600 (243 hectares)	*Myoporum* dominated tree and shrublands, *Metrosideros* treelands, *Sophora* shrublands, *Pennisetum* grasslands, and barren lava
Anti-Armor Live Fire Range	75 (30 hectares)	Barren lava, *Metrosideros* treelands, *Sophora* shrublands, and *Myoporum* dominated tree and shrublands

Source: Developed as part of ESA Section 7 consultation.

Off-road mounted maneuver would occur on approximately 31,230 acres (12,755 hectares) at PTA, primarily in the WPAA (Figure 2-6). Use of PTA Trail and the WPAA would increase the stress on the environment. The impact of all vehicle use in the PTA ROI is estimated at 92,794 MIMs as compared to the 13,659 MIMs based on all current vehicles. This increase would have a severe impact on the ROI. Strykers driven off-road in the WPAA would trample vegetation, general and sensitive alike, and would greatly increase soil erosion in the maneuverability areas (see Section 9.9 for detailed analysis of soil erosion). Wind erosion from dust would also be caused by Stryker vehicle maneuvering through PTA in areas where there is less than 10 percent vegetative cover and under the same circumstances in the WPAA.

Dismounted maneuvers at Training Area 23 would degrade this high value habitat. This area, identified as BSA1, is the location of many sensitive species observations and is likely to be used by many more sensitive species than have been recorded. The area where dismounted maneuvers are proposed occurs outside of the prohibited MPRC area. This area has not been used previously for dismounted maneuvers. Soldiers participating in concealment and firing activities, part of SBCT-proposed dismounted training in this area, would trample and disturb vegetation, which would deter sensitive wildlife from using the land.

In general, construction of the proposed ranges and increased training associated with the Proposed Action would degrade wildlife habitat within the PTA ROI.

Regulatory and Administrative Mitigation 4.

- In accordance with Section 404 of the Clean Water Act, the US Army Corps of Engineers Regulatory Branch must review any activities involving the discharge of dredged or fill material into waters of the US prior to construction to determine whether a Department of Army permit is required. If so, the Corps would determine whether a previously issued general permit authorizes the proposed action, or it would process a

permit application for the proposed fill. If a Corps permit were required, a Section 401 Water Quality Certification issued by the State of Hawai'i Department of Health, Clean Water Branch, would also be required, as well as compliance with other applicable federal law.

- ESA Section 7 Consultation and other Regulatory and Administrative Mitigations 1, 2, and 3 would apply to this impact and would help reduce the impact to a less than significant level. Regulatory and Administrative mitigation measures identified in Section 8.8, Water Resources and Section 8.9, Geology, Soils, and Seismicity, would lessen this impact on sensitive species and habitat.

Additional Mitigation 4. Potential mitigation measures for this impact include:

- Continuing to allow grazing on the Ke'āmuku Parcel when it is not in use for training to keep the fuel load of the alien grasses below a dangerous level.
- Using native plants in any new landscaping or planting efforts, where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.
- Fencing or flagging, where practicable, any sensitive plant communities from activities that may take place within the ROI.
- Preserve or restore sensitive habitat when feasible on its owned or leased lands.
- Avoiding where practicable all lava tubes found to contain or potentially to support native root-dependent arthropods or cultural resources. All generated construction would be channeled away from lava tubes.
- Dividing up the Keamuku Parcel into training areas and using ITAM LCTA to determine the optimum training rotation to maximize vegetative regrowth while maintaining training.
- Constructing a natural and cultural resources visitor center at PTA, adjacent to the new Saddle Road alignment. The visitor center would provide interpretive displays of the biological and cultural resources of not only PTA but also the region between Mauna Loa and Mauna Kea and would include a small theater for interpretive video or live presentations. The center also would house the PTA resource managers and lab facilities. The goals of the center would be twofold: educate people to the value of natural resources and involve them in the preservation and restoration of biological resources on the island of Hawai'i.
- HQDA is considering investigating a new regulatory authority to work with nonprofit organizations to purchase buffer lands.
- Additional mitigation measures identified as part of Section 8.8, Water Resources and Section 8.9, Geology, Soils, and Seismicity would lessen this impact on sensitive species and habitat.

Additional Mitigations 1, 2, 3, and 4, including ESA Section 7 Consultation, would apply to this impact and would help reduce the impact to a less than significant level.

Less than Significant Impacts

Threat to migratory birds. The presence of the FTI antennas could significantly affect migratory bird species known to occur in the PTA ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai'i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000).

Some migratory bird species known to occur at PTA that could be adversely affected by the Proposed Action include the white-tailed tropicbird, black-crowned night heron, barn owl, golden plover, and northern cardinal (USARHAW and 25th ID[L] 2001a). USFWS tower guidelines (USFWS 2000), in Appendix I-2, would be integrated into the proposed project to ensure that MBTA species would not be significantly affected by constructing antennas in the SBCT ROI. Key avoidance measures include using no lighting or guy wires on the towers and keeping all towers below 199 feet (61 meters).

UAVs would be allowed in restricted airspace over the entire training area, but activity is not anticipated to threaten night-migrating birds. If night collisions with birds did occur, then UAV operations would be halted at night until the USFWS and the Army could agree on a solution.

The following Army SOPs and BMPs identified for federal agencies in EO 13186 would help minimize the overall impact of SBCT actions on migratory birds:

- In accordance with the MBTA, USARHAW would avoid polluting or altering the environment of migratory birds and would monitor them in the proposed ROI, focusing on species of concern, where practicable, to ensure that migratory bird numbers do not decline because of the Proposed Action; and
- USARHAW annually is inventorying, monitoring, and collecting and assessing information on natural resources in training areas using ITAM LCTA and Army ecosystem management that might be considered relevant to migratory bird conservation. Information gathered would be shared with the USFWS, the Biological Resources Division of the USGS, and other appropriate repositories, such as the Cornell Laboratory of Ornithology.

Noise and visual impacts. The Proposed Action would have short- and long-term noise impacts on terrestrial wildlife. These impacts would be negative but less than significant. Areas surrounding the proposed PTA Trail, BAAF runway upgrade and extension, ammunition storage, and range maintenance facility projects would be exposed to greater human noise as a result of these projects. The human noise level at BAAF and the PTA cantonment area is already high. This circumstance, along with the disturbed habitat in which these facilities are located, limits the species occurring there to those that are more tolerant of human activity. Therefore, wildlife in or around these project locations would not be significantly affected by these activities. (Potential noise impacts on the palila are discussed in Impact 2.) Increased

noise as a result of construction is not expected to affect terrestrial wildlife, because field surveys have shown that it is not a significant factor in behavior and does not affect reproductive success (US Army Engineering District 2000). Noise produced as part of proposed training activities would be mitigated by ESA Section 7 Consultation. These measures would ensure that noise impacts on sensitive species would be less than significant. No significant visual impacts are expected to terrestrial species.

Less than significant impacts on marine wildlife are expected from vessel noise. LSVs and barges do emit sounds into the marine environment, and these sounds do add a component of low frequency noise to the habitat. Noise associated with vessels under the Proposed Action may already affect marine life in the Sanctuary, since LSVs and barges have been in use since 1998. Wildlife reactions to noise depend on a variety of factors. It has been shown that marine wildlife react adversely to the introduction of low frequency sounds in their habitat, such as that which emanates from LSVs and barges (Richardson et al. 1995). However, in the absence of other low frequency noise sources, which can occur in Hawaiian waters (such as those from other projects, like the North Pacific Acoustic Laboratory or from the Low Frequency Active Sonar project), the magnitude and intensity of noise impacts from these vessels are not expected to be significant. Frequency of vessel use is not high, and animals in the ROI are habituated to this type of ship noise.

Less than significant impacts on marine wildlife are expected from SBCT helicopter activity between O'ahu and the island of Hawai'i. Over the ocean, the aircraft normally fly at least 1,000 feet above sea level. There is no change in helicopter activity expected from existing conditions under SBCT. The Aviation Brigade of the 25th Infantry Division has local flying rules SOPs that include a 1,000-foot (300- meter) vertical limit over whales and, more recently, over monk seals and dolphins when sighted. These procedures have already been communicated to all units flying in Hawai'i and will be formally incorporated into the local flying rules. The SOP includes a suggestion that future rules will apply to vertical as well as lateral altitude limits. They also suggest altering flight paths once wildlife is observed.

No significant noise or visual marine wildlife disturbances specific to the Proposed Action are expected from other activities at Kawaihae Harbor. This includes disturbance from harbor construction or from establishing a fixed tactical tower at this site. Construction-related noise impacts are not expected to be significant because they would be short-term and would be mitigated by the reduced transmission of sound through the air-water interface. The chance of a monk seal hauling out on this coastline is considered remote because the harbor is so highly trafficked. Impacts on this species from activities in the Sanctuary under the Proposed Action are not considered to be significant.

Vessel impacts on marine wildlife. Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. The increase from 60 to 66 LSV trips a year is minor and not significant. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. (Low frequency and/or mid-range sonars have been shown to cause injury and mortality in marine wildlife [Rossiter 2003], but these emissions typically occur off of vessels engaged in defense training maneuvers, not transport). Existing MMPA regulations prohibit any boats in

Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit through Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under the Proposed Action are not considered to be significant. Theater Support Vessel (TSVs) are not in use at this time, however they may be utilized in the future. When and if that occurs, separate NEPA documentation will be done to address impacts from TSV use to marine wildlife. There is a minimal chance of ship strikes (direct hits on marine mammals) with LSVs or barges, but these are considered to be minimal due to the slow speed of the vessels.

Runoff impacts on marine wildlife and coral ecosystems. There would be less than significant impacts on marine wildlife and coral ecosystems in the PTA ROI. No significant impacts from potential runoff are expected for marine wildlife resources or coral ecosystems. The expected increase in erosion to the ocean would be within the natural range that exists due to rainfall and runoff variation. Impacts on marine wildlife and coral ecosystems in the ROI waters are not considered to be significant.

Impacts on general vegetation and wildlife. The Proposed Action would disturb general vegetation and wildlife by removing vegetation, deterring wildlife from foraging, and promulgating other general degradation effects that would result from elevated human activity in the PTA ROI.

Native vegetation communities and barren lava prevail in the areas of proposed construction. As mentioned in the affected environment section, these communities are all affected by fountain grass, which can rapidly invade a disturbed community. Impacts in these areas would include trampling and disturbance from vehicles and military personnel. Communities within the proposed range areas would be disturbed by trampling and general operation of the ranges. In addition, operation of the proposed ranges could affect biological resources within the impact area and associated surface danger zones. The use of certain types of ammunition increases the chances of starting fires in the impact area and within the surface danger zones. The potential introduction of fire resulting from the operation of the proposed ranges is also discussed under Impact 1 and Impact 3.

Due to the weight of the Stryker vehicle, vegetation in areas where the Stryker performs off-road maneuvers likely would be crushed or flattened along tire paths. Stryker maneuvers would generally occur in unforested areas, including areas at PTA that contain native vegetation communities. Vegetation communities within the WPAA, which would be used for maneuver training, are predominantly nonnative but can contain individual sensitive species. Stryker operations on roads and trails within the installation would not be expected to affect biological resources. Off-road maneuvers could adversely affect biological resources, including vegetation, wildlife, and threatened and endangered species. However, the Army would implement SOPs to prevent adverse impacts on biological resources.

Vehicle movements on the ranges and through maneuver training areas would disturb soils and increase the amount of dust in the air. Increased dust levels could adversely affect plants

in the vicinity of vehicle movements by interfering with photosynthesis. Additional impacts associated with dust and air quality are discussed in Section 9.5.

Use of the UAV would occur over much of the land area at PTA but would not be expected to affect biological resources during normal operation. Due to the nature of the UAV, accidents would be possible and could cause wildfires. The impact of potential wildfires within the ROI is discussed under Impact 1.

To help manage some of these impacts, all lands used for general training under the Proposed Action would be included in the Army's ITAM program. The ITAM program would also incorporate the above mentioned comprehensive wildfire management plan. In addition, natural resources personnel and USARHAW range control staff would routinely inspect all maneuver lands to ensure the land is not being degraded. The Army would also minimize the effect of training on sensitive species and sensitive habitats (see below).

Operation of the ranges is likely to displace various wildlife species, such as birds and rodents. Mobile wildlife would vacate areas immediately adjacent to the ranges while the ranges were in use due to disturbance. Displacement would likely be caused by increased human presence in the area, as well as by elevated noise levels. Wildlife within the impact area and associated surface danger zones could be affected by ordnance or other munitions. The potential introduction of fire, which could affect wildlife, is discussed under Impact 1.

Off-road maneuvers would occur throughout portions of PTA and the WPAA. Wildlife in these areas would be expected to sustain minor adverse impacts as a result of off-road maneuvers. Off-road maneuvers would occur in unforested areas generally dominated by nonnative plant species. Wildlife would generally be expected to vacate areas that are being used for off-road maneuvers. However, wildlife species that do not vacate could sustain injuries. The most likely species to be affected by off-road maneuvers would be ground-nesting birds or small mammals.

Increased noise levels associated with the Proposed Action would not be expected to adversely affect wildlife species at PTA or the WPAA.

Reduced Land Acquisition Alternative

Under Reduced Land Acquisition, biological resources impacts at PTA would generally be very similar to the Proposed Action, with the following exceptions:

- QTR2 would not be built on the SRAA but rather on the Range 8 site at PTA. Construction and operation of QTR2 would occur within approximately 120 acres (49 hectares) in the vicinity of Range 8. Because QTR2 would be located within an existing PTA range area, collocated with the AALFTR, similar impacts and mitigation measures would occur under Reduced Land Acquisition as under the Proposed Action.
- Additional off-road mounted maneuvers would occur within the PTA ROI.

These changes would result in increases in impacts on PTA biological resources, but would not change the overall significance level of those impacts.

Significant Impacts Mitigable to Less than Significant

Impact 1: Loss and degradation of sensitive species and habitat. Under Reduced Land Acquisition, there would be additional Stryker maneuvering off-road. The 25,855 MIMs proposed for road maneuvers in the SRAA under the Proposed Action would be reallocated to PTA for primarily off-road maneuvers, for a total of 118,649 MIMs. The addition of MIMs in the PTA ROI would exacerbate an already severe impact by causing further vegetation destruction and soil erosion. Compare Figures 8-28 and 8-29 with 2-10 to see the proximity of known sensitive species and habitat to the proposed QTR2 and mounted maneuverability areas. Specifically, Range 8 contains populations of *Silene hawaiiensis*. Under Reduced Land Acquisition, additional natural vegetation communities could be adversely affected, including barren lava, *Metrosideros* treelands, *Sophora* shrublands, and *Myoporum* dominated tree and shrublands**.** The same SOPs, BMPs, and mitigation measures described in Impact 4 would be applied for this impact.

Regulatory and Administrative Mitigation 1. The ecosystem management directives and Army stewardship, described in Chapter 2, Section 2.2.4, would minimize fire impacts by protecting and restoring sensitive species and habitat.

Impact 2: Impacts from fire on sensitive species and habitat. Impacts from fire on sensitive species would be similar to those described in Proposed Action Impact 1, but there would be an even greater probability of training induced wildfires. Construction of QTR2 on PTA Range 8 would likely increase the amount of live-fire training at PTA, thereby resulting in the potential to increase the frequency of wildfires, presenting an additional potentially significant adverse impact on sensitive species, such as *Silene hawaiiensis,* and habitat.

Regulatory and Administrative Mitigation 2. The same SOPs, BMPs, and mitigation measures described in Proposed Action Impact 1 and Section 8.12.2 would be applied under this alternative. The implementation of increased fire prevention and fire fighting measures would reduce this impact to less than significant.

Less than Significant Impacts

Less than significant biological resources impacts associated with Reduced Land Acquisition would be largely identical to less than significant biological resources impacts associated with the Proposed Action, with the following exception:

Impacts on general vegetation and wildlife. In general, construction of QTR2 at Range 8 would likely increase potential impacts on general vegetation and wildlife in the immediate vicinity. These impacts would likely be limited to the 120 acres (49 hectares) of immediate disturbance associated with the QTR2 firing and targetry box and those areas outside of the firing and targetry box that may be affected by stray ammunition rounds. Construction would likely increase the potential for construction-related impacts due to airborne dust that settles on vegetation in the immediate vicinity. This impact would be temporary and is considered to be a less than significant impact. The construction of QTR2 at Range 8 would

likely increase the amount of surface area disturbed at PTA, resulting in potentially a slight loss or degradation of general habitat. However, since Range 8 is already a heavily disturbed live-fire range site with little to no suitable habitat for species other than nonnatives, invasive species, and pest species, these changes would be considered less than significant.

No Action Alternative

An analysis of Legacy Force training impacts on PTA biological resources can be found in the PTA INRMP (USARHAW and 25th ID[L] 2001b).

Significant Impacts Mitigable to Less than Significant

Impact 1: Impacts from fire on sensitive species and habitat. Legacy Force training threatens native habitat and sensitive species in the PTA ROI. Military activities have burned areas of native vegetation and threatened habitat for federally listed flora and fauna. The Army would produce and implement a comprehensive wildland fire management plan for PTA, to be finalized in 2004. Additionally, the mitigation for wildland fire management listed under the Proposed Action should be implemented for Legacy Force training, including reducing the densities of fire-adapted introduced species. Mitigation for wildland fires would be the same as those under the Proposed Action. In addition, the following Legacy Force fire avoidance and mitigation measures would be continued:

- Reevaluating and revising PTA's current fire control plan and program for inclusion into the Hawai'i general fire management plan;
- Regularly updating ICS contact personnel and reviewing fire control protocols;
- Posting signs about the Army's regulations concerning ignition sources;
- Addressing fire control in a fire management plan;
- Improving fire education and awareness by preparing educational materials on fire hazards and preventative measures; and
- Maintaining fire access roads and fire breaks.

Impact 2: Impacts on federally listed species and their federally designated or proposed critical habitat (palila and its critical habitat). Legacy Force activities occur near designated palila critical habitat. The BAAF and PTA cantonment area are located on or near the critical habitat (Figure 8-31). The primary threat posed to palila and palila designated critical habitat is disruption to vegetation and ecological communities caused by training activities and use of BAAF that occurs in the vicinity of valuable palila habitat. This leads to the introduction and spread of nonnative and potentially invasive species. Palila's food source, mamane seeds and flowers, would be threatened by the introduction of nonnative vegetation (USGS 2001b). The introduction of nonnative animals could continue to lead to increased predation, such as from mongoose. Nonnative animals could also act as disease vectors and are thought to be one of the reasons for the palila's sharp decline (USGS 2001b and 2001c). Secondarily, activities are likely to disrupt and deter use of nearby palila habitat and lower its potential value. The USARHAW continues to consult with the USFWS under ESA Section 7 to evaluate impacts on listed species and will consult for proposed plant-critical habitat when it

receives its federal designation. Measures necessary to avoid and compensate for negative impacts on listed species and habitat will be determined during this process.

Impact 3: Impact on sensitive species resulting from the spread of nonnative species. Existing impacts on biological resources would continue under No Action. Alien plants and animals, some of which may be invasive, have likely been introduced and would continue to be introduced into natural areas at PTA. Transport of troops around the installation and between islands spreads weedy species via clothing and vehicles. In compliance with EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize risk of harm caused by invasive species. Army environmental management (Chapter 2, Section 2.2.4), including research, monitoring, and stabilization projects, would reduce these impacts to the less than significant level.

Impact 4: Loss and degradation of sensitive species and habitat. Ground maneuver training disturbs the erosion-prone soils at PTA, affecting vegetation and wildlife. Firing points, parking areas, and bivouac sites are heavily used and become denuded. Loss of vegetation increases erosion that affects access and usability of the area. Training actions create dust that affects general and sensitive vegetation and causes general degradation of habitat structure. Dust and other airborne soil particles settle on plants, possibly limiting their ability to photosynthesize. Dust impacts result from the use of roads and from training activities and are a repeated effect of Legacy Force actions. The LRAM component of ITAM seeks to stabilize soils and provide long-term vegetative cover to support military land use. Restoration of these areas should include revegetating with native species and increased protection of sensitive areas. In addition to addressing training impacts, the Army should make it a priority to eradicate wild pigs, goats, and sheep from areas of PTA that include sensitive species. These animals are vectors for weedy species spread, can devastate populations of native plants, and can destroy habitat for native flora and fauna. Army environmental management (Chapter 2, Section 2.2.4), including research, monitoring, and stabilization projects, would reduce these impacts to the less than significant level.

Less than Significant Impacts

Threat to migratory birds. No threats to migratory birds as a result of routine training have been identified.

Vessel impacts on marine wildlife. Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. There are 60 LSV and 4 barge trips per year. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under No Action are not considered to be significant.

Runoff impacts on marine wildlife and coral ecosystems. No significant impacts from potential runoff are expected for marine wildlife resources or coral. The expected increase in erosion at the harbor, described in Chapter 7, Section 7.08, would be within the natural range that exists due to rainfall and runoff variation. Continued development and construction add to the decline of this reef system via the following mechanisms: interruption of long-shore transport due to harbor development, consequent siltation of Pelekane Bay, and the close proximity to important cultural sites, causing increased recreational use and human presence (CRAMP 2003). Over time, these mechanisms would further the decline of the coral that is already a special management concern.